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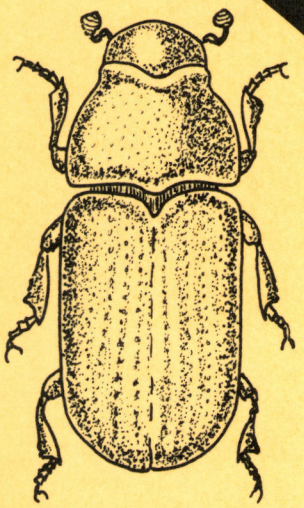

Southwestern Region

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BIOLOGICAL EVALUATION
Douglas-fir Beetle

North Rim
Grand Canyon National Park
Arizona

1972

Branch of Forest Insect and Disease Management
Division of Timber Management
Southwestern Region, USDA, Forest Service
517 Gold Avenue, SW
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INTRODUCTION

On May 31, 1972, Harold Flake and Charles Germain, entomologist and biological technician, respectively, evaluated the Douglas-fir beetle population and host tree stand conditions on the North Rim of Grand Canyon National Park. Epidemic Douglas-fir beetle populations in the early 1960's caused extensive mortality in the Douglas-fir stands on the North Rim. Outbreaks of Douglas-fir beetle in the Southwest have been associated with drought. The current drought is the primary factor causing the increased activity of the Douglas-fir beetle.

On the North Rim of Grand Canyon National Park and adjacent Kaibab National Forest, an estimated 400 to 500 trees were attacked in 1971. A substantial Douglas-fir beetle population was found in the trees sampled. The infested trees are mature and overmature, with a d.b.h. range of 18 to 36 inches. The infestation is in the initial stages of an outbreak, and the trend is upward. Maintenance control may be necessary if aesthetic, recreational, and other resource values are adversely affected within Grand Canyon National Park.

TECHNICAL INFORMATION

Insect.--Douglas-fir beetle, Dendroctonus pseudotsugae Hopk.

Host.--Douglas-fir, Pseudotsuga menziesii

Extent and Location of Damage.--The infestation is primarily confined to Grand Canyon National Park, with only a few scattered trees on the Kaibab National Forest. The infestation within the National Park is concentrated on 600 acres around the sanitary landfill in Marble Flats.

Fig. 1.--Infested trees in the Marble Flats area. Sanitary landfill lower left-hand corner.

Groups of 10 to 20 infested trees are scattered throughout this area. The infested trees are on the ridge tops and midslopes. West of the Marble Flats area, scattered single infested trees are visible. The Grand Canyon National Park and Kaibab National Forest both contain a vulnerable Douglas-fir tree resource.

BIOLOGICAL EVALUATION

Methods.--Bark samples were removed from 13 infested trees at 6 to 7 feet with a chain saw. The bark samples were brought to our Albuquerque laboratory for examination.

Visual observations on site quality, species composition, and age classes were made throughout the Marble Flats area.

Results.--The bark samples showed a large and viable adult beetle population. A total of 45 mature larvae, pupae, and adults were found per square foot of bark area.

The infested Douglas-fir are in mixed and uneven-age stands. The stands are composed primarily of white fir, Douglas-fir, and ponderosa pine. All age classes of the host species are represented. Reproduction is adequate in the areas examined.

The infested trees are on the ridge tops and midslopes. The sites are good.

DISCUSSION

The evaluation data indicate the tree-killing by the Douglas-fir beetle will continue. The number of trees that will be attacked by the 1972 summer flight will increase. The Douglas-fir beetle is more aggressive in the arid portions of its range, and once outbreaks develop, they subside slowly.

The drought is the primary factor causing the outbreak. Drought affects the outbreak in two major ways: the vigor of trees is reduced, which makes them more susceptible to insect damage; and population biotic restraints decline, allowing explosive population buildup. After the drought is broken, it will take several growing seasons for the trees to regain their normal vigor and resistance to attack.

The infestation within the National Park boundaries should have no appreciable effect upon the adjacent Kaibab National Forest lands. Drought conditions will determine the trend and ultimate outcome of the infestation. If pockets of infested trees develop within the Kaibab National Forest, preliminary plans would be to use trap trees and salvage logging to suppress the infestation, where feasible. The use of direct chemical control methods on the Kaibab National Forest is not anticipated.

RECOMMENDATIONS

We recommend that National Park Service personnel evaluate the impact of the tree-killing as it affects the aesthetics, recreational, and other resource values within the National Park. Any suppressive action against this pest would be a holding action until the drought ended. Tree losses could be minimized, but control of the infestation could not be accomplished through suppressive action. Should your evaluation indicate suppression is warranted to minimize tree losses, two possible alternatives, or a combination of the two, are available.

1. Direct chemical treatment with ethylene dibromide of the currently infested trees. Estimated cost is $20.00 per tree. Must be completed by May 10, 1973.

2. Post-flight treatment using Silvisar 510 of trees attacked in 1973. Timing is critical. Estimated cost is $5.00 to $7.50 per tree.

Both ethylene dibromide and Silvisar 510 are registered for use against the Douglas-fir beetle.

If Forest Pest Control funds are used for suppression, an impact evaluation is required. Our Insect and Disease Management personnel can assist National Park Service personnel in the preparation of this item and operational phases of the suppression project, should one be undertaken.